

CLAIMS

1. An apparatus, wherein the apparatus is a temperature-independent microscopic switch, comprising:

a substrate, wherein is at least configured to support  
5 the switch;

a conductive beam, wherein the conductive beam is at least configured to be suspended with one free end;

means for engaging, wherein the means for engaging at least engages the conductive beam to allow signal  
10 transmission; and

at least one tether, wherein the at least one tether is at least configured to be attached to the substrate and attached to the conductive beam.

15 2. The apparatus of Claim 1, wherein the apparatus further comprises means for insulation, wherein the means for insulation at least provides a non-conductive barrier between the conductive beam and at least one electrode when the microscope switch is engaged.

20

3. The apparatus of Claim 2, wherein the means for insulation further comprise air.

25 4. The apparatus of Claim 2, wherein the means for insulation further comprise Silicon Oxide ( $\text{SiO}_2$ ).

5. The apparatus of Claim 2, wherein the means for insulation further comprise Silicon Nitride ( $\text{Si}_3\text{N}_4$ ).

6. The apparatus of Claim 1, wherein the apparatus  
5 further comprises an ohmic contact when the microscopic switch is engaged.

7. An apparatus, wherein the apparatus is a temperature-independent microscopic switch, comprising:

10 a plurality of electrodes, wherein the plurality of second electrodes;

a least one spring means, wherein the at least one spring means is at least configured to be attached to at least one of the plurality of electrodes at one end;

15 a conductive beam, wherein the conductive beam is at least configured to be suspended, and wherein the beam is at least configured to be attached to the at least one spring means at a second end; and

means for engaging, wherein the means for engaging at least engages the conductive beam to allow signal transmission.

20 8. The apparatus of Claim 7, wherein the apparatus further comprises means for insulation, wherein the means for insulation at least provides a non-conductive barrier between

the conductive beam and at least one electrode when the microscopic switch is engaged.

9. The apparatus of Claim 8, wherein the means for  
5 insulation further comprise air.

10. The apparatus of Claim 8, wherein the means for  
insulation further comprise Silicon Oxide ( $\text{SiO}_2$ ).

10 11. The apparatus of Claim 8, wherein the means for  
insulation further comprise Silicon Nitride ( $\text{Si}_3\text{N}_4$ ).

12. The apparatus of Claim 8, an ohmic contact when the  
microscopic switch is engaged.

15 13. The apparatus of Claim 7, wherein the at least one  
spring means further comprises:

a plurality of spring means wherein each individual  
spring means of the plurality of spring means at least is  
20 configured to be attached to at least one electrode; and

each individual spring means of the plurality of spring  
means is at least configured to be connected to the conductive  
beam.

14. The apparatus of Claim 13, wherein the apparatus further comprises means for insulation, wherein the means for insulation at least provides a non-conductive barrier between the conductive beam and at least one electrode when the 5 microscopic switch is engaged.

15. The apparatus of Claim 14, wherein the means for insulation further comprise being selected from a group of air, Silicon Oxide ( $\text{SiO}_2$ ), and Silicon Nitride ( $\text{Si}_3\text{N}_4$ ).

10

16. The apparatus of Claim 13, wherein the apparatus further comprises an ohmic contact when the microscopic switch is engaged.

15

17. A method of operation of a temperature-independent microscopic switch, comprising:

engaging the switch;

signal transmission through the switch once engaged;

disengaging the switch once signal is transmitted;

20

preventing of warping of a flexible beam that is configured to at least operate as a throw arm once the temperature-independent microscopic switch is engaged.

25

18. The method of Claim 17, wherein the step of

preventing of warping further comprises engaging tethers.

19. The method of Claim 17, wherein the step of preventing warping further comprises compressing a spring means.

5

20. A microscopic switch, comprising:  
at least one first electrode, wherein a first surface of  
the at least one first electrode is at least configured to be  
coupled to the substrate on, and wherein the at least one  
10 first electrode possess at least one bump on a second surface;

a dielectric material, wherein a first surface of the  
dielectric is at least configured to be coupled to the second  
surface of the at least one first electrode, and wherein a  
second surface of the dielectric material is at least  
15 configured to imitate the second surface of the at least one  
first electrode; and

a suspended beam, wherein the suspended beam is at least  
configured to conform to the second surface of the dielectric  
material when engaged.

20

21. The microscopic switch of Claim 20, wherein  
suspended beam further comprises at least having increased  
stress across the entire beam when engaged.

22. The microscopic switch of Claim 20, wherein the at least one bump is designed so as to increase the restoring force of the suspended beam.

5        23. A method for decoupling an actuation force and a restoring force for a suspended beam in a microscopic switch, comprising:

engaging the microscopic switch, wherein the suspended beam is pulled to a lower assembly to substantially touch the lower assembly;

imitating the surface of the lower assembly by the suspended beam once engaged; and

creating internal stress in the suspended beam when imitating the surface of the lower assembly.

15        24. A cantilever MEMS switch comprising a tether having at least two ends, wherein a first end of the tether is at least coupled to a substrate, and wherein, a second end of the tether is at least coupled to the a cantilever arm.

20        25. The cantilever MEMS switch of Claim 24, wherein the substrate is at least configured to be non-conductive.

25        26. The cantilever MEMS switch of Claim 25, wherein the apparatus further comprises means for insulation, wherein the

means for insulation at least provides a non-conductive barrier when the microscope switch is engaged.

27. The cantilever MEMS switch of Claim 26, wherein the  
5 means for insulation further comprise air.

28. The cantilever MEMS switch of Claim 26, wherein the means for insulation further comprise Silicon Oxide ( $\text{SiO}_2$ ).

10 29. The cantilever MEMS switch of Claim 26, wherein the means for insulation further comprise Silicon Nitride ( $\text{Si}_3\text{N}_4$ ).

15 30. The cantilever MEMS of Claim 25, wherein the cantilever MEMS further comprises an ohmic contact when the cantilever MEMS is engaged.

31. A fixed-fixed MEMS switch comprising:  
a plurality of electrodes;  
a suspended conductive beam; and  
20 a plurality of spring means, wherein each of the spring means is at least coupled to at least one electrode at a first end, and wherein each of the spring means is at least coupled to the suspended conductive beam at a second end.

32. The fixed-fixed MEMS switch of Claim 31, wherein the fixed-fixed MEMS switch further comprises a substrate, wherein the substrate is at least configured to be non-conductive, and wherein the substrate is at least coupled to the plurality of 5 electrodes.

33. The fixed-fixed MEMS switch of Claim 32, wherein the fixed-fixed MEMS switch further comprises means for 10 insulation, wherein the means for insulation at least provides a non-conductive barrier when the fixed-fixed MEMS switch is engaged.

34. The fixed-fixed MEMS switch of Claim 33, wherein 15 wherein the means for insulation further comprise air.

35. The fixed-fixed MEMS switch of Claim 33, wherein the means for insulation further comprise Silicon Oxide ( $\text{SiO}_2$ ).

20 36. The fixed-fixed MEMS switch of Claim 33, wherein the means for insulation further comprise Silicon Nitride ( $\text{Si}_3\text{N}_4$ ).

37. The fixed-fixed MEMS switch of Claim 33, wherein the fixed-fixed MEMS further comprises an ohmic contact when the fixed-fixed MEMS is engaged.